

### ***In the Claims***

The status of claims in the case is as follows:

1        1.    [Currently amended] Method for evaluating a network by  
2        deriving its discrete utilization and streaming utilization  
3        from observations of work performed on packets by a system  
4        including said network, comprising the steps of:

5            transmitting into said network a plurality of bursts of  
6            packets;

7            responsive to said bursts of packets, determining a  
8            streaming utilization of said network;

9            transmitting into said network a plurality of packets  
10          in isolation and of different lengths;


11          responsive to said plurality of packets, measuring  
12          average message delay through said network;

13          determining a standard deviation of said message delay;

14           and

15           calculating a discrete utilization of said network as a  
16           ratio of said average message delay to said standard  
17           deviation.

1       2.   [Original]   The method of claim 1, further comprising  
2       the steps of:

3           factoring instances of dropped messages as full  
4           utilization in calculating said discrete utilization. 

1       3.   [Previously presented]   Method for evaluating a  
2       network, comprising the steps of:

3           communicating of a plurality of long packets and short  
4           packets through said network;

5           determining a best time of said long packets;

6           determining a best time of said short packets;

7 responsive to a length of said long and short packets  
8 and their respective best times, determining Network  
9 Queue Wait Time (Tw) and a standard deviation of  
10 Network Queue Wait Time, ( $\sigma Tw$ );

11 responsive to said Tw and  $\sigma Tw$ , calculating a discrete  
12 utilization (p) of said network.

1 4. [Original] The method of claim 3, wherein said Tw,  $\sigma Tw$   
2 and p are related by the expression:

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$$Tw / \sigma Tw = p / \sqrt{(p * (2 - p))} .$$

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5. [Canceled]

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6. [Canceled]

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7. [Currently amended] ~~The method of claim 6, further~~

~~comprising the steps of:~~ Method for evaluating a network,

comprising the steps of:

sending test packets across said network;

based upon number of test packets transmitted, number  
of bytes per test packet, send and receive time stamps  
of each test packet, and number of test packets lost in  
transmission, deducing a capacity of said network, its  
latency, and a current utilization of said capacity;

calculating network hop count as a measure of a minimum  
number of hops of network bottleneck hop speed that  
could be in said network;

responsive to said network hop count, determining a  
minimum network discrete utilization;

responsive to said test packets, determining as a  
maximum network discrete utilization a number of  
messages queued per network hop count; and

responsive to said minimum network discrete utilization

19           and said maximum network discrete utilization,  
20           determining a best approximation of end to end discrete  
21           utilization.

22       8.   [Original]   The method of claim 7, further comprising  
23       the step of:

24           adjusting said end to end discrete utilization for  
25           dropped test packets.

1       9.   [Previously presented]   The method of claim 7, said  
2       best approximation of end to end discrete utilization being  
3       an average of said minimum network discrete utilization and  
4       said maximum network discrete utilization.

1       10. [Original]   The method of claim 7, further comprising  
2       the step of:

3           adjusting said best approximation of end to end  
4           discrete utilization by selectively weighting said  
5           minimum network discrete utilization or said maximum  
6           network discrete utilization responsive to network  
7           streaming utilization.

1 11. [Canceled]

1 12. [Currently amended] ~~The method of claim 11, further~~  
2 ~~comprising the step of~~ A method for evaluating network  
3 characteristics from observations of work performed on  
4 packets by a system including said network, comprising the  
5 steps of

6 determining a minimum network discrete utilization;

7 determining as a maximum network discrete utilization a  
8 number of messages queued per network hop count; and

9 responsive to said minimum network discrete utilization  
10 and said maximum network discrete utilization,  
11 determining a best approximation of end to end discrete  
12 utilization;

13 determining average message service time;

14 calculating a standard deviation of network queue wait

15        time ( $\sigma Tw$ ) = square root of (utilization \* (2-  
16        utilization)) \* (average message service time / (1 -  
17        utilization)); and  
  
18        ~~determining Tw~~ determining network queue wait time (Tw)  
19        = utilization \* average message service time / (1 -  
20        utilization).

1        13. [Currently amended] A method for evaluating a discrete  
2        utilization of a network, comprising the steps of  
  
3        transmitting probative samples of at least two sizes  
4        through said network;  
  
5        time stamping said probative samples; [[and]]  
  
6        responsive to said probative samples, calculating ~~the~~  
7        ~~average~~ an average wait time delay and a standard  
8        deviation of said average delay of said network;  
  
9        responsive to said probative samples, determining a  
10        minimum network discrete utilization and a maximum

11        network discrete utilization as respective functions of  
12        ratios of said average delay of said network to a  
13        standard deviation of said average delay; and  
  
14        responsive to said minimum network discrete utilization  
15        and said maximum network discrete utilization,  
16        determining a best approximation of end to end discrete  
17        utilization.

1        14. [Original] The method of claim 13, said samples  
2        comprising one way echo packets.

1        15. [Original] The method of claim 13, said samples  
2        comprising two way echo packets.

1        16. [Canceled]

1        17. [Currently amended] The method of ~~claim 16~~ claim 13,  
2        further comprising the steps of:

3        fine tuning said discrete utilization by averaging



4 dropped instances of said samples with successful  
5 transmissions of said samples to derive a measure of  
6 discrete utilization based upon a total set of said  
7 probative samples.

1 18. [Canceled]

1 19. [Currently amended] ~~The program storage device of~~  
2 ~~claim 18,~~ A program storage device readable by a machine,  
3 tangibly embodying a program of instructions executable by a  
4 machine for evaluating a network, comprising:

5 an apparent network speed analysis application module  
6 for measuring average message delay through said  
7 network, determining a standard deviation of said  
8 message delay, and calculating a discrete utilization  
9 of said network as a ratio of said average message  
10 delay to said standard deviation;

11 a service level and capacity planning routine module  
12 for tuning said network; said service level and  
13 capacity planning routine module ~~further comprising~~

14            ~~routines~~ for calculating change in network traffic  
15           before network response time service level is  
16           compromised, determining additional file load capacity  
17           ~~of the network~~ of said network and adjusting window  
18           size for file transfer to fill remaining capacity.

1           20. [Currently amended] A program storage device readable  
2           by a machine, tangibly embodying a program of instructions  
3           executable by a machine for evaluating a network from  
4           observations of work performed on packets by a system  
5           including said network, comprising:

6           a first program module for transmitting into said  
7           network a plurality of packets in isolation and of  
8           different lengths for measuring average message delay  
9           through said network;

10          a second program module for determining a standard  
11          deviation of said message delay; and

12          a third program module for calculating a discrete  
13          utilization of said network as a function of the ratio

14 of said average message delay to said standard  
15 deviation.

1 21. [Currently amended] A program storage device readable  
2 by a machine, tangibly embodying a program of instructions  
3 executable by a machine to perform method steps for  
4 evaluating a network from observations of work performed on  
5 packets by a system including said network, said method  
6 steps comprising:

7 transmitting into said network a plurality of packets  
8 in isolation and of different lengths;

9 measuring average message delay through said network;

10 determining a standard deviation of said message delay;  
11 [[and]]

12 calculating a discrete utilization of said network as a  
13 function of the ratio of said average message delay to  
14 said standard deviation; and

15        determining a best approximation of end to end discrete  
16        utilization from minimum network discrete utilization  
17        and maximum network discrete utilization determined  
18        from said observations.

1        22.    [Canceled]

1        23.    [Canceled]

1        24.    [Currently amended]    ~~The method of claim 23, further A~~  
2        program storage device readable by a machine, tangibly  
3        embodying a program of instructions executable by a machine  
4        to perform method steps for evaluating a discrete  
5        utilization of a network from observations of work performed  
6        on probative samples by a system including said network,  
7        comprising the steps of:

8                transmitting probative samples through said network;

9                time stamping said probative samples;

10               responsive to said samples, calculating the average

11       wait time and a standard deviation of average delay of  
12       said network;

13       deriving said discrete utilization as a function of a  
14       ratio of a wait time of said network to a standard  
15       deviation of the average wait time;

16       determining a minimum network discrete utilization;

17       determining as a maximum network discrete utilization a  
18       number of messages queued per network hop count;

19       responsive to said minimum network discrete utilization  
20       and said maximum network discrete utilization,  
21       determining a best approximation of end to end discrete  
22       utilization; and

23       fine tuning said discrete utilization by averaging  
24       dropped instances of said samples with successful  
25       transmissions of said samples to derive a measure of  
26       discrete utilization based upon a total set of said  
27       probative samples.

1 25. [Previously presented] The program storage device of  
2 claim 21, said steps further comprising:

3 factoring instances of dropped messages as full  
4 utilization in calculating said discrete utilization.

1 26. [Currently amended] A program storage device readable  
2 by a machine, tangibly embodying a program of instructions  
3 executable by a machine to perform operations for evaluating  
4 a network, said operations comprising:

5 communicating of a plurality of long packets and short  
6 packets through said network;

7 determining a best time of said long packets;

8 determining a best time of said short packets;

9 responsive ~~to of said~~ to said long and short packets  
10 and their respective best times, determining Network  
11 Queue Wait Time ( $T_w$ ) and a standard deviation of  
12 Network Queue Wait Time, ( $\sigma T_w$ );

13 responsive to said Tw and  $\sigma Tw$ , calculating a discrete  
14 utilization (p) of said network.

1 27. [Currently amended] The program storage device of  
2 ~~claim 3~~ claim 26 wherein said Tw,  $\sigma Tw$  and p are related by  
3 the expression:

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$$Tw / \sigma Tw = p / \sqrt{(p * (2 - p))} .$$

1 28. [Canceled]

1 29. [Canceled]

1 30. [Currently amended] ~~The program storage device of~~  
2 ~~claim 29, said operations further comprising:~~ A program  
3 storage device readable by a machine, tangibly embodying a  
4 program of instructions executable by a machine to perform  
5 operations for evaluating a network, said operations  
6 comprising:

7 sending test packets across said network;

8       based upon number of test packets transmitted, number  
9       of bytes per test packet, send and receive timestamps  
10      of each test packet, and number of test packets lost in  
11      transmission, deducing a capacity of said network, its  
12      latency, and a current utilization of said capacity;  
  
13      calculating network hop count as a measure a minimum  
14      number of hops of network bottleneck hop speed that  
15      could be in the network;  
  
16      responsive to said network hop count, determining the  
17      minimum network discrete utilization;  
  
18      responsive to said test packets, determining as a  
19      maximum network discrete utilization a number of  
20      messages queued per network hop count; and  
  
21      responsive to said minimum network discrete utilization  
22      and said maximum network discrete utilization,  
23      determining a best approximation of end to end discrete  
24      utilization.



1 31. [Previously presented] The program storage device of  
2 claim 30, said operations further comprising:

3 adjusting said end to end discrete utilization for  
4 dropped test packets.

1 32. [Previously presented] The program storage device of  
2 claim 30, said best approximation of end to end discrete  
3 utilization being an average of said minimum network  
4 discrete utilization and said maximum network discrete  
5 utilization.

1 33. [Previously presented] The program storage device of  
2 claim 30, said operations further comprising:

3 adjusting said best approximation of end to end  
4 discrete utilization by selectively weighting said  
5 minimum network discrete utilization or said maximum  
6 network discrete utilization responsive to network  
7 streaming utilization.

1 34. [Canceled]

1 35. [Canceled]